

In the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Previously Presented) A thin film magnetic head comprising:
 - a lower core layer extending from a surface facing a recording medium in a height direction;
 - a protruding layer extending on the lower core layer for a predetermined length from the surface facing the recording medium in the height direction;
 - a back gap layer disposed on the lower core layer separated from a rear end of the protruding layer by a first distance in the height direction;
 - a coil layer disposed in a space surrounded by at least the lower core layer, the protruding layer and the back gap layer;
 - a coil insulating layer covering the coil layer, tops of the coil insulating layer, the protruding layer and the back gap layer being planarized to a continuous flat surface;
 - a Gd-determining layer disposed on the flat surface separated from the surface facing the recording medium by a second distance in the height direction.
 - a lower magnetic pole layer and gap layer disposed in that order on the flat surface in each of a region between the surface facing the recording medium and the Gd-determining layer and a region behind the Gd-determining layer in the height direction; and
 - an upper magnetic pole layer disposed on the gap layer and the Gd-determining layer;
 - wherein the lower magnetic pole layer, the gap layer and the upper magnetic pole layer have a same planar shape, and a track width is determined by a width of the upper magnetic pole layer in a track width direction at the surface facing the recording medium.

2. (Previously Presented) A thin film magnetic head according to claim 1, wherein the lower magnetic pole layer, the gap layer and the upper magnetic pole layer are formed by plating.

3. (Currently Amended) A thin film magnetic head according to claim 1, wherein ~~the~~an upper core layer is formed on the upper magnetic pole layer into the same planar shape as that of the upper magnetic pole layer, and the upper magnetic pole layer and lower magnetic pole layer have a higher saturation magnetic flux density than that of the upper core layer.

4. (Previously Presented) A thin film magnetic head according to claim 3, wherein the upper core layer has a larger thickness than that of the upper magnetic pole layer.

5. (Currently Amended) A thin film magnetic head according to claim 1, wherein the upper magnetic pole layer and lower magnetic pole layer have a higher saturation magnetic flux density than ~~those~~that of the lower core layer, the protruding layer and the back gap layer.

6. (Currently Amended) A thin film magnetic head according to claim 1, wherein the upper magnetic pole layer has a planar shape comprising a front end portion which has a width corresponding to the track width at the surface facing the recording medium and which extends in the height direction while the width ~~one of~~ remains substantially constant ~~and~~or widens, and a rear end portion which widens from a base end of the front end portion in the track width direction so that the width increases in the height direction.

7. (Previously Presented) A thin film magnetic head according to claim 1, wherein a boundary between a bottom and a front end surface of the Gd-determining layer, which is positioned more proximate to the surface facing the recording medium than a rear end surface of the Gd-determining layer, is positioned on the protruding layer;

the Gd-determining layer is formed on both the protruding layer and the coil insulating layer; and

a length from a boundary between the top and rear end surface of the protruding layer in the height direction to the boundary between the bottom and rear end surface of the Gd-determining layer in the height direction is larger than a maximum thickness of the Gd-determining layer.

8. (Previously Presented) A thin film magnetic head according to claim 7, wherein the boundary between the bottom and rear end surface of the Gd-determining layer is positioned one of on the back gap layer and on a boundary between the top and front end surface of the back gap layer, which is positioned more proximate to the surface facing the recording medium than a rear end surface of the back gap layer, and the Gd-determining layer is disposed between the top of the coil insulating layer and a bottom of the upper magnetic pole layer.

9. (Previously Presented) A thin film magnetic head according to claim 1, further comprising a first plated underlying layer provided on at least a portion of the flat surface between a rear end surface of the Gd-determining layer and a front end surface of the back gap layer, which is positioned more proximate to the surface facing the recording medium than a back end surface of the back gap layer, the lower magnetic pole layer being formed on the first plated underlying layer by plating.

10. (Previously Presented) A thin film magnetic head according to claim 9, wherein the first plated underlying layer comprises a nonmagnetic metal material.

11. (Previously Presented) A thin film magnetic head according to claim 9, further comprising a second plated underlying layer formed on the protruding layer and separated from the first plated underlying layer, wherein at least the Gd-determining layer is disposed between the first and second plated underlying layers, the second plated underlying layer comprises a magnetic material, and the lower magnetic pole layer is formed on the second plated underlying layer by plating.

12. (Previously Presented) A thin film magnetic head according to claim 1, further comprising a third plated underlying layer formed on only a portion of the Gd-determining layer, the upper magnetic pole layer being formed on the third plated underlying layer by plating.

13. (Previously Presented) A thin film magnetic head according to claim 1, wherein the coil layer is formed on a plane parallel to the surface of the lower core layer so as to be wound around the back gap layer as a center.

14. (Previously Presented) A thin film magnetic head according to claim 1, wherein the coil layer comprises a plurality of first coil segments formed in parallel to each other in the space surrounded by the lower core layer, the protruding layer and the back gap layer, and a plurality of second coil segments formed in parallel to each other on the upper magnetic pole layer with an insulating layer provided therebetween, the first coil segments being non-parallel to the second coil segments; and

an end of each first coil segment and an end of each second coil segment face each other in the thickness direction of the upper magnetic pole layer and are connected to each other through a connecting portion to form a toroidal coil structure.

15-27. (Cancelled)